
RSX
For us, the sky isn't the limit.
It just gets in the way.
Meet Canada's Next Generation of
Space Engineers and Entrepreneurs.
Robotics for Space Exploration (rsx-utoronto.ca)
University of Toronto Institute for Aerospace Studies
2017-2018 Sponsorship Package
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Who are we, and why are we here?

Robotics for Space Exploration (RSX) was co-founded in May of 2013 by passionate roboticists, space enthusiasts, and undergraduate engineering students. The recent explosion in interest in space exploration is what triggered the formation of RSX. With organizations working on Mars-bound spacecraft, teams around the world racing to win the Google Lunar X Prize, undergraduate students launching nano-satellites, and companies aspiring to mine asteroids, there has been a shift in the age-old paradigm that only a limited number of highly specialized organizations can partake in space exploration. Fortunately, many of our alumni have found jobs at companies like MDA and SpaceX to further their skills and thirst for space exploration.

Needless to say, space exploration is an exciting and challenging venture. The field of space engineering is growing at a rapid pace and we hope that RSX will play a part in bolstering the interest in space and space engineering, and develop the next generation of skilled Canadian engineers who will be at the forefront of the space industry. By designing, building, and testing robots designed for planetary and lunar exploration, RSX competes in space engineering competitions around the world. At heart, our true passion is manned space exploration, and we hope to build robotic systems to facilitate it.

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So what exactly do we do? A lot.

Terrestrial Robotics

Over the past four years, we have quickly grown our team to include a talented group of executives along with over 40 dedicated members from multitudes of disciplines including the various streams of engineering and natural sciences. In our founding year, we embarked on our first terrestrial mission, MRSX-1. Against all odds, we were able to successfully send a team and our fully functional Martian rover, which we called 'Origin', to compete against teams from around the world at the 2014 University Rover Challenge (URC), in the sandy, barren deserts of Utah. We returned in 2015 with a far more polished, unique, and robust 'Galaxy' rover and performed significantly better than our founding year. In 2016, more than 60 teams from 12 countries participated in the URC. Facing the new challenge, our passionate Rover Team designed and manufactured a brand new rover, 'Carbon', with an innovative all-carbon-fiber design. We then returned in 2017 to create our innovative 'Phoenix' rover which included a brand-new arm, suspension system, and printed circuit boards. This year, thanks to our vastly increased experience, and the resources that we have acquired with the support of our sponsors, we are well on our way towards designing and building an incredible new rover. One which we feel may not be too far from being qualified for Mars exploration!

Atmospheric Robotics

In 2015, we also competed for the first time in the CanSat competition, where we designed, built, and launched a robotic payload on a rocket in Burkett, Texas. Returning in 2017, the team placed in the top 14 among 40 participants. Currently, we are working on our fourth generation payload, which will deploy a glider at apogee and perform scientific tasks on descent to simulate entry into a planet's atmosphere. We've also managed to launch high altitude balloons carrying custom payloads to conduct engineering and scientific experiments at the edge of space.

Community Outreach

Our outreach team is also striving to increase community interest in space exploration and promote STEM in the Greater Toronto Area. In 2014, we began organizing SEEK (Space Engineering and Exploration Kompetition), which is a full day initiative at UofT, where more than 60 students compete to design and build the best mini Mars rover in one day. This year we hope to continue making the competition even bigger, and host a similar competition for high school students

The University Rover Challenge. Mars on Earth.

The University Rover Challenge (URC) is RSX's main mission. The URC is an annual international competition hosted by the Mars Society for University and College students. University teams around the world compete to design and build the next generation of Mars rovers that will one day work alongside human explorers in the field. The competition is held at the Mars Desert Research Station in southern Utah, quite literally in the middle of nowhere!

As we found during our last three missions, URC is a very challenging and unique competition, one that challenges both man and machine. The URC requires student teams like us to tackle the complexities of robotics, field science, communications and systems engineering while solving problems in the harshest of environments. Our rovers, Origin, Galaxy, Carbon, and Phoenix successfully competed in the following tasks, which are reflective of a real Martian Expeditions:

- ***Sample Return Task:***

Teams must select multiple sites of biological interest within a 0.5km radius of their base, and collect and return sub-surface samples. They must also analyze the collected samples, and present results to a panel of judges.

- ***Equipment Servicing Task:***

The rover must perform general maintenance tasks such as measuring voltage across exposed terminals, cleaning a solar panel, reading meters, pushing buttons and flipping switches, and replenishing generator fuel supply.

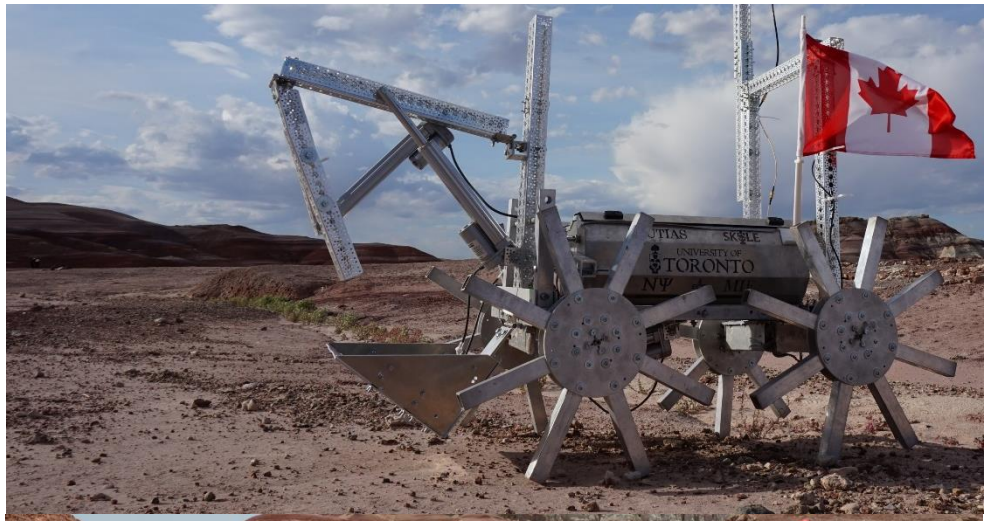
- ***Extreme Retrieval Task:***

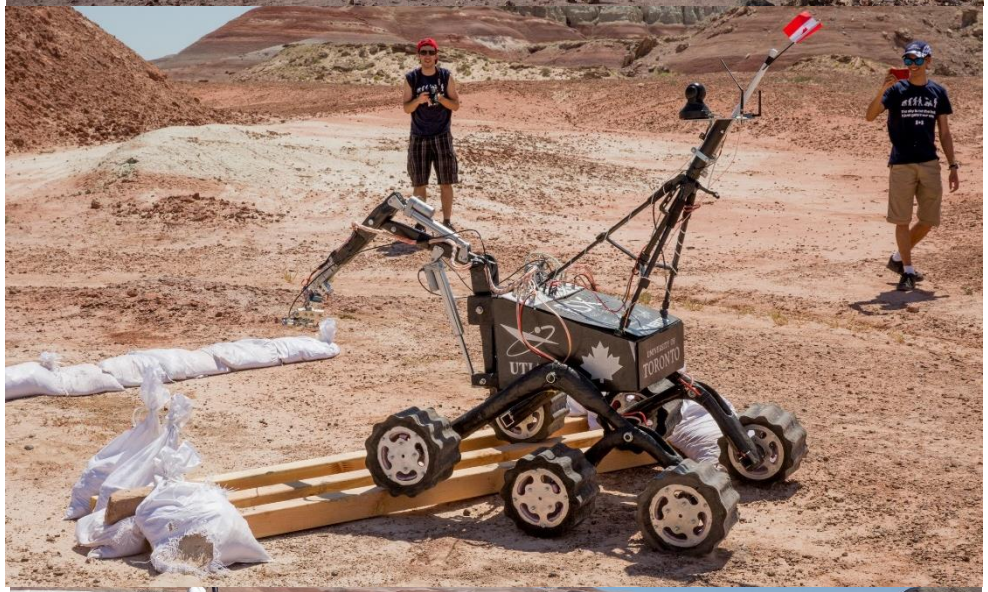
Given approximate GPS coordinates, teams are required to deliver multiple supply containers to simulated astronauts in the field as quickly as possible. Rovers will also be required to traverse a variety of difficult terrains as part of an engineering field test of the ruggedness and route-finding ability of the rovers.

- ***Autonomous Navigation:***

The rover must navigate from start to finish gates without operator input, relying solely on placed navigators and local landmarks.

All four of our experiences at URC were truly humbling and astounding. We were filled with a sense of pride for being able to design, build and compete with a fully functional rover on a relatively conservative budget; however, we recognized our shortcomings in past competitions and are anxious to start on our next iteration and make our mark at the URC again in 2018. With an increased passion for innovation and a renewed focus on robustness we are ready to take on the barren deserts of Utah once again.





Launch, descent, science. The real deal, and every kid's dream.

The thrill of being a newcomer at a competition like the URC - facing so many unknowns along the way and pushing ourselves to the limits – and the expansion of our stellar team have motivated us to tackle more than just the URC competition. We took a strong interest in building robotic payloads for rockets and decided to enter the international CanSat competition. We traveled to Texas and actually launched our payload aboard a low altitude rocket!

For us, CanSat is more than just a competition; it is an opportunity for us to demonstrate the depth and competence of our team while working on a mission with real application in the space industry. While the URC acts as our driving force for developing world class robotic systems to rove extraterrestrial bodies, CanSat pushes us to develop systems that withstand the harshness of space travel.

CanSat is an annual student design-build-launch competition organized by the American Astronautical Society (AAS) and American Institute of Aeronautics and Astronautics (AIAA). The upcoming mission takes place in Burkett, Texas in June, 2017. The competition is intended to simulate a real space mission, starting with a project design report submission and culminating at the launchpad in Texas where our system will take off on board of a small rocket. The payload we have to design will have to simulate a science vehicle traveling through a planetary atmosphere sampling the atmospheric composition during descent.

This year's mission involves our payload deploying a secondary system at apogee which will descend back to Earth in a controlled manner. We have senior aerospace engineering students working hard on the task, and we are already testing many prototypes. In addition to the deployable, we will have a full stack of sensors, live telemetry and video, and much more on board. In order to test the CanSat in a more accurate setting as opposed to simply dropping it from several stories up, we will be building our own rocket this year as well, and will likely make use of our in-house high altitude ballooning expertise as well.

We're much more than just a bunch of space geeks. Outreach matters, a lot.

High School Outreach

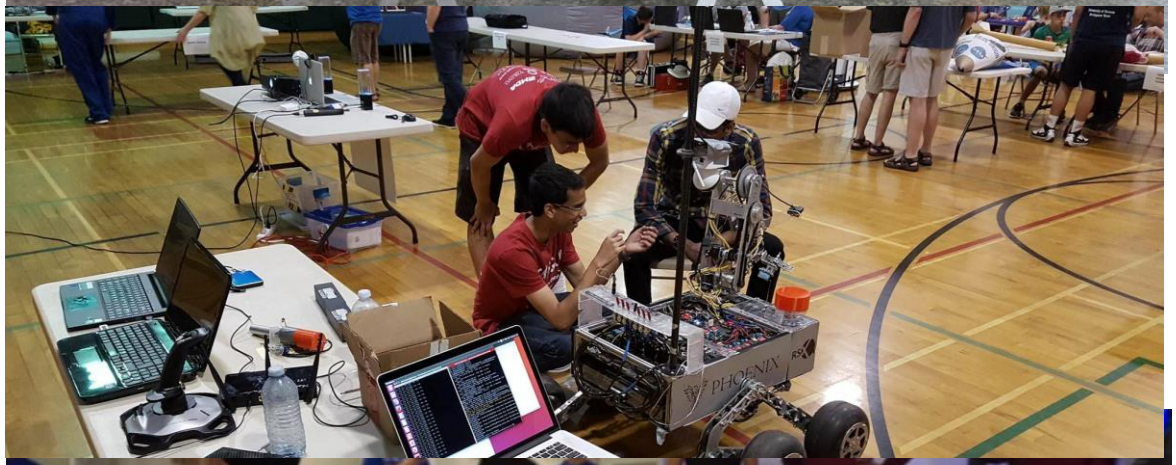
RSX feels that the passion and drive necessary to pursue a career in engineering is developed before starting one's undergraduate studies. Many of the members of RSX are now studying engineering because of their profound, and in many cases, life-changing experiences in high school (e.g. high school engineering design competitions). As part of our outreach division, we visit high school students at their schools and robotics competitions to talk about the opportunities a post-secondary education offers from an extra-curricular standpoint. There we conduct demonstrations, talk about our adventures, and share our love for space!

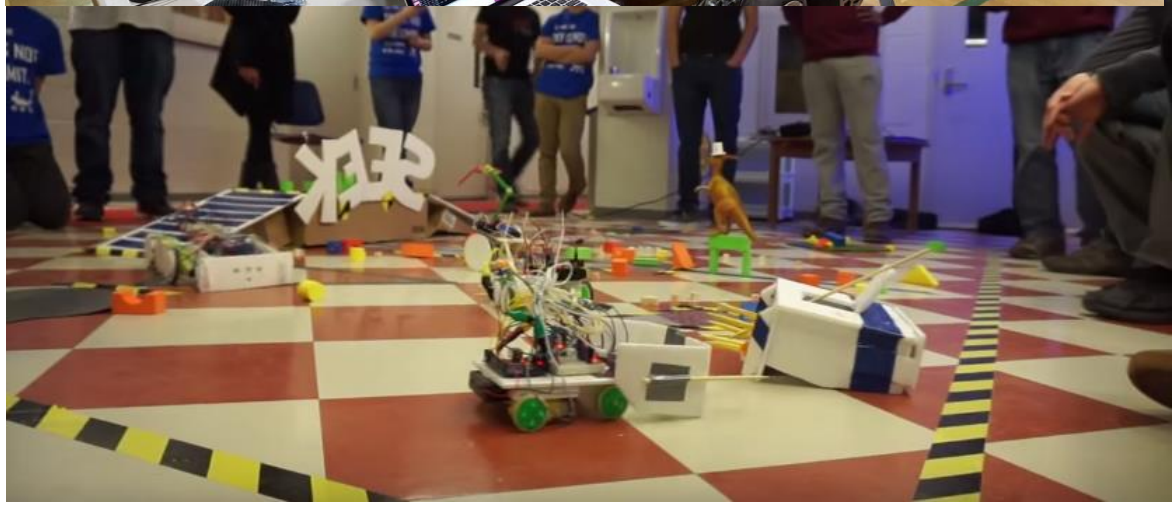
Public Outreach

Gaining public interest in our work is vital; ask anyone from CSA to NASA and they'll agree wholeheartedly. Bringing our projects back to Earth, and explaining their relevance and importance is key in order for our team to thrive now, and as professionals in the industry very soon. Our initiatives on this front include setting up demonstrations at the Ontario Science Center and elementary schools where kids and seniors alike have an opportunity to try out our robots, ask us questions, and offer us advice. We have also participated in elementary school events where we gave live demos of our latest rover (fresh from URC 2017). Some three year olds are quite wise!

SEEK

SEEK was one of our most exciting initiatives. SEEK 2014 (Space Exploration and Engineering Kompetition) was a competition we hosted locally at UofT where we invited 16 teams of 3 students each to a full day of learning, building, and competing. Our own version of a space robotics hackathon. We had guest speakers kick off the day to inspire everyone, and then we dove right in to the technical work. In 2015, SEEK was an experiment for RSX and it was an unbelievable success. In 2016, we expanded the competition to accommodate an increasing number of teams that showed interest. This year we intend to organize an even larger event, and kick-start Hi-Skule SEEK - a smaller scale version for high school students in February 2018.





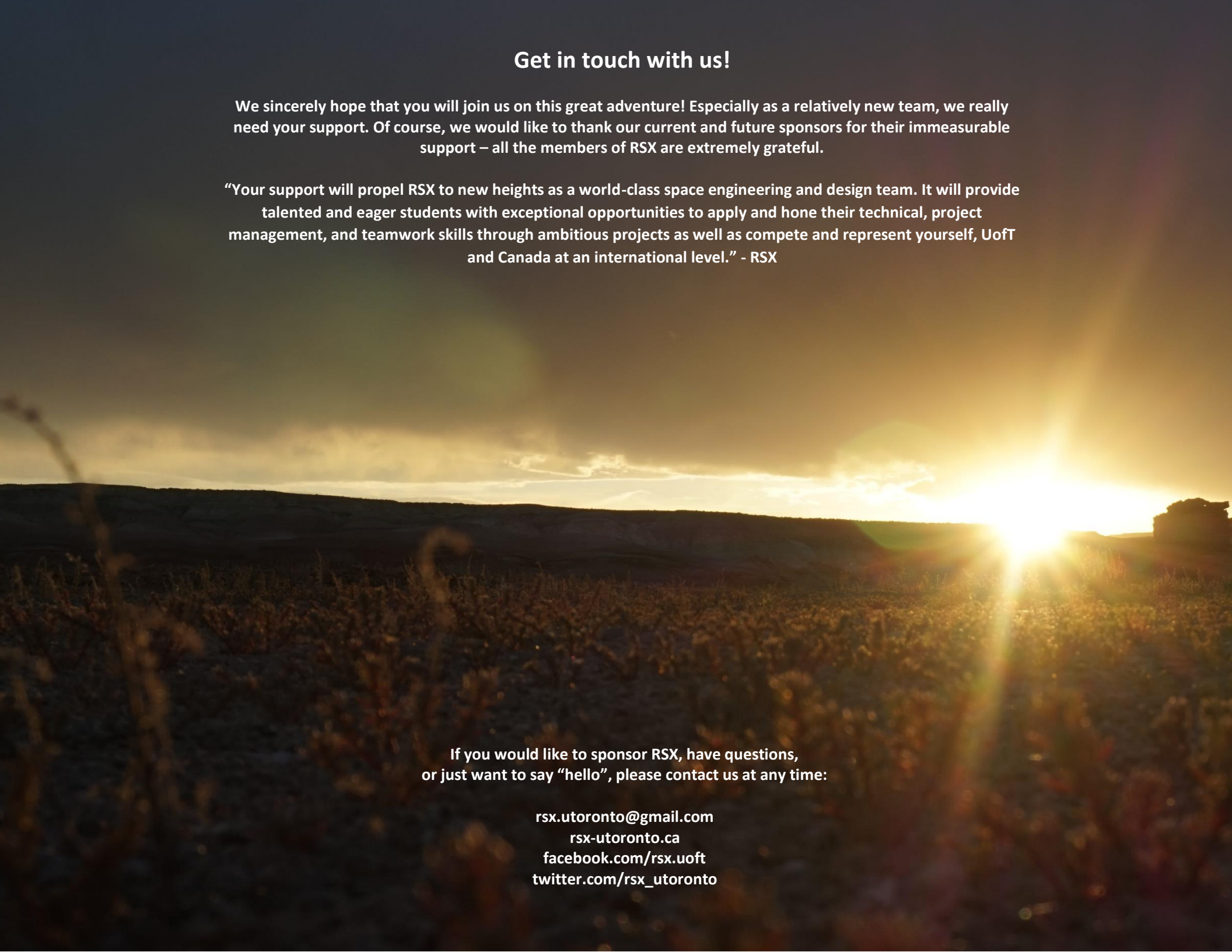
We're proud of our achievements, but we need your support to go further – much further.

RSX sponsors will support an ambitious and multi-disciplinary undergraduate design team at Canada's top engineering school. RSX is also supported and affiliated with UTIAS, Canada's leading aerospace research institute. With your support, we will compete in international competitions and offer unprecedented learning experiences to our members all while promoting and nurturing an entrepreneurial spirit of innovation, creativity and ambition within Canada.

You, as a sponsor, will provide RSX with the necessary resources to complete the full design and manufacturing of our fifth generation Martian Rover, which will compete in the URC 2018, ERC (European Rover Challenge) 2018, and our CanSat system which will compete at the 2018 CanSat competition. But these competitions are only the beginning! With your support, RSX hopes to design and build many more robots that will participate in other competitions around the world, representing UofT, Canada, and most importantly, you. Your funding will contribute significantly to our outreach activities, and SEEK as we aim to expand the competition very rapidly this year by involving high school students as well.

Sponsoring RSX is an opportunity to learn more about over five thousand bright undergraduate and graduate engineering students at the University of Toronto. Furthermore, as a sponsor you will receive a multitude of perks such as placing your logo on our website, rover, and all promotional material, invitations to exclusive demonstration events and tours, signed team pictures, t-shirts, patches and much more. Our sponsorship options are listed in the following section. We thank you very much for your invaluable support!

Sponsorship Levels/Benefits	Platinum (over $5,000)	Gold ($2,500 – 4999)	Silver ($1000 – 2499)	Bronze ($100 – 999)
Logo and link on our sponsors page on the team website	✓	✓	✓	✓
Invitation to exclusive demo event of the rover before the competition + tour of UTIAS (aerospace facilities, space systems engineering laboratories, Mars Dome, and more!)	✓	✓	✓	✓
Framed team picture with rover, HAB, and CanSat signed by the entire team, with your logo and a personalized thank-you letter	✓	✓	✓	✓
Logo on all promotional material (banners, posters, booklets, etc.)	✓	✓	✓	
RSX wearable swag with your logo on it (shirts, sweaters, etc.)	✓	✓	✓	
Logo on the competing Rover, HAB, and CanSat (x-large, large, medium, small – size depends on sponsorship amount)	✓	✓		
Personal visit to your office to present our design, robots, team, and mission	✓	✓		
Prominent logo and link on home page banner of the team website and on cover photos for all RSX social media pages	✓			



Get in touch with us!

We sincerely hope that you will join us on this great adventure! Especially as a relatively new team, we really need your support. Of course, we would like to thank our current and future sponsors for their immeasurable support – all the members of RSX are extremely grateful.

“Your support will propel RSX to new heights as a world-class space engineering and design team. It will provide talented and eager students with exceptional opportunities to apply and hone their technical, project management, and teamwork skills through ambitious projects as well as compete and represent yourself, UofT and Canada at an international level.” - RSX

If you would like to sponsor RSX, have questions,
or just want to say “hello”, please contact us at any time:

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Notes